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Contributions to the knowledge of the Aleocharinae (Coleoptera, Staphylinidae) in the Maritime Provinces of Canada

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Abstract

Since 1970, 203 species of Aleocharinae have been recorded in the Maritime Provinces of Canada, 174 of which have been reported in the past decade. This rapid growth of knowledge of this hitherto neglected subfamily of rove beetles occasions the present compilation of species recorded in the region together with the chronology of their discovery. Sixteen new provincial records are reported, twelve from Nova Scotia, one from New Brunswick, and three from Prince Edward Island. Seven species, including *Oxypoda chantali* Klimaszewski, *Oxypoda perexilis* Casey, *Myllaena cuneata* Notman, *Placusa canadensis* Klimaszewski, *Geostiba* (*Sibiota*) *appalachigena* Gusarov, *Lypoglossa angularis obtusa* (LeConte), and *Trichiusa postica* Casey [tentative identification] are newly recorded in the Maritime Provinces, one of which, *Myllaena cuneata*, is newly recorded in Canada. A preliminary analysis of the composition of the fauna indicates that the percentage of adventive species (18.2%) is consistent with that of other groups of Coleoptera. Both Cape Breton Island and Prince Edward Island are comparatively faunistically under-represented, in all probability as a result of insufficient collecting effort in these areas. A species accumulation curve indicates that it is probable that further species of aleocharines remain to be documented in the region.

Keywords

Coleoptera, Staphylinidae, Aleocharinae, Canada, Maritime Provinces, New Brunswick, Nova Scotia, Prince Edward Island, biodiversity, species accumulation

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Introduction

The recent explosion of interest and information with respect to the rove beetle subfamily Aleocharinae in the Maritime Provinces of Canada (New Brunswick, Nova Scotia, and Prince Edward Island) has been remarkable and dramatic, particularly given the long history of neglect of this group in the region. This lack of attention is in many respects unsurprising, given the complex and difficult taxonomy of the group. Even so, in comparison with other groups of Coleoptera in the region, and with interest in aleocharines in other portions of the continent, the historical attention that this group has received in the region in the past has been exceptionally meagre.

The first published report of an aleocharine from the Maritime Provinces was by Howden (1970) who recorded *Falagria dissecta* Erichson on Sable Island, Nova Scotia, along with five other species that were tentatively identified only to genus (three of these have subsequently been determined as *Atheta novaescotiae* Klimaszewski and Majka, *Mocyta breviuscula* (Mäklin), and *Crataraea suturalis* (Mannerheim) (C.G. Majka and J. Klimaszewski, unpublished data). There are no records of any aleocharines from the Maritime Provinces in catalogues such as Leng (1920) and Moore and Legner (1975), nor in any of the historical papers on the Coleoptera of the region. There are voucher specimens of aleocharines from the region collected as early as 1910, however, the unresolved taxonomy of the group prohibited investigators from identifying them.

It was not until studies such as Klimaszewski (1979, 1982a, 1982b, 1984) and Hoebeke (1985) that taxonomists began examining aleocharine specimens from the Maritime Provinces and including such records in taxonomic treatments. Campbell and Davies (1991), a compilation of Coleoptera records from Canada and Alaska, listed only 27 species from the region, based almost entirely on records provided by the above studies.

There was very little further research on this subfamily in the Maritime Provinces for the next decade, until in 2001 a series of papers began that, over the span of the last decade, has dramatically increased knowledge of the aleocharine fauna of the region. One hundred and seventy-four species have been added to the region's faunal list during this time. Due to this very rapid increase in knowledge, it has been difficult to keep track of all the contributions to the region's faunal lists, and even the recent catalogue of Gouix and Klimaszewski (2007) is now substantially out of date.

The purpose of this paper is to add further jurisdictional records of aleocharines to the region's faunal list, provide a compendium of the species that have been recorded in the Maritime Provinces, and the studies that have documented their presence, and briefly examine some aspects of the fauna in general, and of the increase in knowledge of the group in the region.

Methods and conventions

Codens (following Evenhuis 2009) of collections referred to in this study are:

CBU	Cape Breton University, Sydney, Nova Scotia, Canada
CGMC	Christopher G. Majka collection, Halifax, Nova Scotia, Canada
DHWC	David H. Webster collection, Kentville, Nova Scotia, Canada
NSMC	Nova Scotia Museum, Halifax, Nova Scotia, Canada
NSNR	Nova Scotia Department of Natural Resources, Shubenacadie, Nova Scotia, Canada
STFX	St. Francis Xavier University, Antigonish, Nova Scotia, Canada
UMNB	Université de Moncton, Moncton, New Brunswick, Canada

In the species treatments, the number of specimens and the collection abbreviation are indicated in parentheses.

Results

Sixteen new provincial records of aleocharines, twelve from Nova Scotia, one from New Brunswick, and three from Prince Edward Island are reported herein. Seven species including, *Oxypoda chantali* Klimaszewski, *Oxypoda perexilis* Casey, *Myllaena cuneata* Notman, *Placusa canadensis* Klimaszewski, *Geostiba* (*Sibiota*) *appalachigena* Gusarov, *Lypoglossa angularis obtusa* (LeConte), and *Trichiusa postica* Casey [tentative identification] are newly recorded in the Maritime Provinces, one of which, *Myllaena cuneata*, is newly recorded in Canada. Specific details of new records are reported below.

Aleochara (*Coprochara*) *bimaculata* Gravenhorst, 1802

NEW BRUNSWICK: Kent County: Buctouche, 13.VI.2007, 18.X.2007, J.P.-Michaud, on decomposing pig (2, UMNB).

Aleochara bimaculata is newly recorded in New Brunswick. In Canada it has been previously recorded in Alberta, British Columbia, Manitoba, Newfoundland and Labrador, Nova Scotia, Northwest Territories, Ontario, Québec, and Saskatchewan. It is found throughout the United States, south to southern Mexico (Klimaszewski 1984). Adults are frequently found at dung, carrion, decomposing mushrooms, and in various kinds of leaf and grass litter (Klimaszewski 1984)

Aleochara (*Xenochara*) *castaneipennis* Mannerheim, 1843

NOVA SCOTIA: Cumberland County: VIII.1965, B. Wright, under sugar maple on mountain slope, pitfall trap (1, NSMC); **Halifax County:** Waverley, 10.VIII.1965, B. Wright, mixed forest, pitfall trap (1, NSMC); Big Indian Lake, 9.VIII.2003, P. Dollin, red spruce forest (80–120 years), pitfall trap (3, NSMC).

Aleochara castaneipennis is newly recorded in Nova Scotia. In Canada it has been previously recorded in Alberta, British Columbia, New Brunswick, Ontario, Québec, and the Yukon (Klimaszewski 1984; Klimaszewski et al. 2005a). In the United States it has been recorded in many jurisdictions in the eastern and western portions of the country, although it is absent in the Great Plains region (Klimaszewski 1984).

Oxypoda chantali Klimaszewski, 2006

NOVA SCOTIA: Antigonish County: Pomquet, IV.1996, R.F. Lauff, leaf litter, male (1, STFX).

Oxypoda chantali is newly recorded in the Maritime Provinces. This species is previously known only from Ontario and Québec (Klimaszewski et al. 2006b). It has been collected in leaf litter in deciduous forests (Klimaszewski et al. 2006b).

Oxypoda perexilis Casey, 1906

NOVA SCOTIA: Colchester County: Bible Hill, 3–9.VII.2007, C.W. D'Orsay, pasture, pitfall trap (4, CBU).

Oxypoda perexilis is newly recorded in the Maritime Provinces. In Canada it has been previously recorded in Ontario and Québec. In the United States it has been recorded in Mississippi, Texas, North Carolina, and Iowa (Klimaszewski et al. 2006b). In other regions it has been collected in dry alvar habitats (Klimaszewski et al. 2006b).

Myllaena arcana Casey, 1911

NOVA SCOTIA: Guysborough County: Melopseketch Lake, 14.V–2.VI.1997, D.J. Bishop, young red spruce forest, flight intercept trap (1, NSMC).

Myllaena arcana is newly recorded in Nova Scotia. In Canada it has been previously recorded in Alberta, New Brunswick, Ontario, and Québec. In the United States it has been found from New Hampshire, west to Iowa and south through Florida and Alabama to Veracruz and Chiapas in Mexico (Klimaszewski 1982a). Specimens have been collected from wet debris near streams, lakes, and ponds (Klimaszewski 1982a).

Myllaena cuneata Notman, 1920

NOVA SCOTIA: Halifax County: Point Pleasant Park, 20.IX.2001, C.G. Majka, coniferous forest, under bark of dead red spruce (2, CGMC).

Myllaena cuneata is newly recorded in Canada. In the United States this species has been found from Florida and Louisiana north to Massachusetts. Specimens have been

collected from organic detritus near a creek and in oak-beech leaf litter (Klimaszewski 1982a).

Eumicrota socia (Erichson, 1839)

PRINCE EDWARD ISLAND: Queens County: Princeton-Warburton Road, 27.VI.2003, C.G. Majka, along small stream in mixed forest (4, CGMC).

Eumicrota socia is newly recorded in Prince Edward Island. In Canada it has been previously recorded in New Brunswick, Nova Scotia, and Québec. It is widely distributed in the central and eastern portions of the United States. (Campbell and Davies 1991; Klimaszewski et al. 2009c). Specimens have been collected in a wide variety of coniferous and deciduous forests, frequently on slightly decayed polypore fungi and gilled fungi of a variety of species (Klimaszewski et al. 2009c).

Gyrophaena (*s. str.*) *gaudens* Casey, 1906

PRINCE EDWARD ISLAND: Queens County: St. Patricks, 17.VIII.2002, C.G. Majka, coniferous forest, on *Cantharellus cibarius* Fr. (1, CGMC).

Gyrophaena gaudens is newly recorded in Prince Edward Island. In Canada it has been previously recorded in New Brunswick, Ontario, and Québec. In the United States it has been recorded in northern regions of the country from Massachusetts and Pennsylvania in the east, west to Michigan and Wisconsin (Klimaszewski et al. 2009c). It is found in mixed and coniferous forests on a variety of gilled and polypore fungi (Klimaszewski et al. 2009c).

Silusa alternans Sachse, 1852

PRINCE EDWARD ISLAND: Queens County: St. Patricks, 17.VIII.2000, C.G. Majka, coniferous forest, on *Cantharellus cibarius* Fr. (1, CGMC).

Silusa alternans is newly recorded in Prince Edward Island. In Canada it has been previously recorded in New Brunswick, Nova Scotia, and Québec. In the United States it has been recorded from Georgia north to New Hampshire (Klimaszewski et al. 2003). It has been collected in deciduous and coniferous forests associated with gilled fungi such as *Clavaria* sp. and *Russula* sp. (Klimaszewski et al. 2003).

Placusa canadensis Klimaszewski, 2001

NOVA SCOTIA: Kings County: North Alton, 2.VI.2005, D.H. Webster, under bark of wind-fallen *Populus grandidentat*a Michx. (4, DHWC).

Placusa canadensis is newly recorded in the Maritime Provinces. In Canada it has been previously recorded in Ontario and Québec; in the United States it is known from Ohio and West Virginia (Klimaszewski et al. 2001). In Québec this species has been found predominantly in sugar maple (*Acer saccharum* Marsh.) stands, occasionally in white spruce (*Picea glauca* (Moench) Voss) forests. They have been collected from under the bark of recently fallen trees and from rotting fungi and tree stumps (Klimaszewski et al. 2001). The specimens in Nova Scotia were found in association with specimens of *Carpophilus sayi* Parsons [Nitidulidae] (abundant), and *Corticeus tenuis* (LeConte) [Tenebrionidae] (infrequent) in the same subcortical habitat.

Acrotona subpygmaea (Bernhauer, 1909)

NOVA SCOTIA: Halifax County: Point Pleasant Park, 20.IX.2001, C.G. Majka, coniferous forest, in bark of dead white pine (1, CGMC).

Acrotona subpygmaea is newly recorded in Nova Scotia. In Canada it has been previously recorded in New Brunswick; in the United States there are records from Massachusetts and Indiana (Klimaszewski et al. 2005a). In New Brunswick it was collected in a red spruce (*Picea rubens* Sarg.) forest (Klimaszewski et al. 2005a).

The status of *Acrotona subpygmaea,* however, is subject to some question. In most respects it appears to be identical to *Acrotona avia* (Casey). There is an unresolved problem in determining the status of these two species names in that while all the external and internal structures of both male and female types of *A. avia* are intact, in the case of the (unpublished) lectotype of *A. subpygmaea* designated by V. Gusarov, the median lobe of the adeagus of the male is missing and the female syntype has a collapsed spermatheca, making it difficult to determine whether these are distinct species or whether *A. avia* should be designated as a junior synonym of *A. subpygmaea*. J. Klimaszewski and collaborators are in the process of revising the eastern Canadian species of the genus *Acrotona*. The present identification should be regarded as tentative, pending this revision.

Atheta (*Microdota*) *particula* (Casey, 1910)

NOVA SCOTIA: Annapolis County: Big Dam Lake, Kejimkujik National Park, 27.VI.–7.VII.2004, H. Love, hemlock forest, pitfall trap (4, CGMC); **Cumberland County:** VIII.1965, B. Wright, under sugar maple in deciduous forest, pitfall trap (1, NSMC); **Digby County:** Pebbleloggitch Lake, Kejimkujik National Park, 13–24. VIII.2004, H. Love, hemlock forest, pitfall trap (4, CGMC); **Halifax County:** Waverley, 10.VIII.1965, B. Wright, mixed forest, pitfall trap (1, NSMC); **Queens County:** Canning Field, Kejimkujik National Park, 26.VI.–6.VII.2004, 14–23.VIII.2004, H. Love, hemlock forest, pitfall trap (18, CGMC); Cobreille Lake, 27.VI–7.VII.2004, H. Love, hemlock forest, pitfall trap (43, CGMC).

Atheta (*Microdota*) *particula* is newly recorded in Nova Scotia. In Canada it has been previously recorded in New Brunswick (Klimaszewski et al. 2005a). In the United States it has been recorded from Rhode Island and New York (Moore and Legner 1975). In New Brunswick it was collected in a red spruce forest (Klimaszewski et al. 2005a). In Nova Scotia they have primarily been found on the forest floor in eastern hemlock (*Tsuga canadensis* (L.) Carr.) forests.

Geostiba (*Sibiota*) *appalachigena* Gusarov, 2002

NOVA SCOTIA: Queens County: Kejimkujik National Park, 24.VIII.1994, B. Wright, hemlock forest, leaf litter (4, NSMC).

Geostiba appalachigena is newly recorded in the Maritime Provinces. In Canada it has been previously recorded in Québec. In the United States it has been collected from Maine to Virginia, west to Wisconsin (Gusarov 2002). It has been found in red spruce and balsam fir (*Abies balsamaea* (L.) Mill) forests, in forest leaf litter (Gusarov 2002).

Lypoglossa angularis obtusa (LeConte, 1866)

NOVA SCOTIA: Cape Breton County: Louisbourg, 28.VI–2.VII.1999, A. Schrage & S.P. Roach, closed spruce woodland, pan trap (2, CBU).

Lypoglossa angularis obtusa is newly recorded in the Maritime Provinces. In Canada it has been previously recorded in Newfoundland and Québec; in the United States it is found in Maine and New Hampshire (Gusarov 2004). The species is common in forest leaf litter and moss in boreal forests; it has also been found on dung in gopher burrows (Gusarov 2004).

Trichiusa postica Casey, 1906

NOVA SCOTIA: Colchester County: Bible Hill, 31.V.2005, S.M. Townsend, cow pasture, sweep net (1, CBU); **Halifax County:** Soldier Lake, 13.VI.2005, J. Gordon, spruce beetle trap (1, NSNR); Petpeswick, 23.VI.1971, B. Wright (1, NSMC).

Trichiusa postica is newly recorded in the Maritime Provinces. In Canada it has been previously recorded in Ontario (Campbell and Davies 1991; Gusarov 2001–2003). The ecology and biology of this species have not been recorded.

This identification should be regarded as provisional. *Trichiusa* is an unrevised genus in North America, and for confirmation, this specimen should be compared with type specimens of this genus. These are on loan from the US National Museum to V. Gusarov and despite efforts we have not been able to obtain them for the purposes of this study.

Zyras obliquus Casey, 1893

NOVA SCOTIA: Lunenburg County: Bridgewater, 1–16.VII.1965, B. Wright, under red oak, pitfall trap (1, NSMC).

Zyras obliquus is newly recorded in Nova Scotia. In Canada it has been previously recorded from British Columbia east to New Brunswick (Klimaszewski et al. 2005b; Webster et al. 2009). In British Columbia this species was found in various coniferous and mixed forests (Klimaszewski et al. 2005b). Note: this species was reported from Nova Scotia by Kehler et al. (1996) [as *Zyras haworthi* (Stephens)] without, however, supplying collection data. In a subsequent examination of this collection by Majka and Bondrup-Nielsen (2006), no voucher specimens of this species were found, rendering the authenticity of the original record moot.

Discussion

Table 1 provides a systematic list of the 203 species of aleocharines that have been found in the Maritime Provinces. Of these, five species [*Phloeopora* sp., *Oligota chrysopyga* Kraatz?, *Oligota* nr. *ruficornis* Sharp, *Acrotona* nr. *smithi* Casey, and *Atheta* nr. *smetanai & campbelli* (Lohse)] are provisional names for species that have not yet been identified to the specific level. Three species (*Philhygra insulivaga* Gusarov, *Philhygra lustrivaga* Gusarov, and *Philhygra riprivaga* Gusarov) are unpublished manuscript names of species which have not yet been formally described. Published references for reports from the Maritime Provinces are arranged in chronological order.

Of the 203 species, 162 (79.8%) are Nearctic in distribution; four (2.0%) have a Holarctic distribution; and 37 (18.2%) are adventive Palaearctic species. A total of 175 species (86.2%) have been recorded in New Brunswick; 125 (61.6%) in Nova Scotia, and 20 (9.9%) in Prince Edward Island. Of the Nova Scotia species, 106 (52.2%) have been recorded on the Nova Scotia mainland, and 57 (28.1%) on Cape Breton Island. There are 19 species recorded on Cape Breton Island that have not been found on the Nova Scotia mainland.

Since the biodiversity of the Maritime Provinces aleocharine fauna is still in an active phase of investigation, it would be premature at present to draw many conclusions from these compositional figures. The overall proportion of adventive species is similar to that of other groups of Coleoptera. For example, in Nova Scotia 15.6% of the province's beetle fauna consists of adventive species (C.G. Majka, unpublished data). The proportion of species recorded to date from both Cape Breton Island (28.1%) and Prince Edward Island (9.9%) appear to be rather low, in all probability indicating a deficit in collection effort for this group in these areas. In the case of the Carabidae, 54.4% of the Maritime Provinces' fauna has been recorded on Cape Breton, and 47.9% on Prince Edward Island (Majka et al. 2007b). Within the Curculionoidea, 35.3% of Maritime Provinces weevils have been recorded on Cape Breton, and 33.2% on Prince Edward Island (Majka et al. 2007a). While there is no *a priori*

reason why these figures should be the same across different taxonomic groups, the data for these better investigated groups in the region appear to underscore the fact that a comparative paucity of collecting effort has under-represented the aleocharine fauna of these two areas.

An indication of the rapid growth of information about the Maritime Provinces' aleocharine composition is provided by Figure 1, a species accumulative curve (based on publication dates) of the region's fauna. Fig. 1 shows that that an asymptote has not yet been approached, suggesting that the fauna of the area is not adequately sampled, and that many additions to it remain to be made. Although the very rapid growth rate of knowledge over the past decade is likely to abate in the future, it is nevertheless clear that more species remain to be documented. Even since the recent publication of Gouix and Klimaszewski (2007), a catalogue of the Aleocharinae of Canada and Alaska, which included records of 96 species from the Maritime Provinces, 107 species have been added to the region's fauna – a 111% increase in the past three years alone.

Aside from sheer numbers of species, an immense amount of work remains to be done on the ecology and biology of most of the species, and on their distribution within the region. For many species, such knowledge is fragmentary and incomplete. Many geographical areas have been little, if at all, sampled and many habitats have been poorly investigated. Nevertheless, in a span of 40 years, knowledge of the Maritime Provinces Aleocharinae fauna has developed from nonexistent to the point where they are the most species rich subfamily of rove beetles in the region.

Table 1. Aleocharinae recorded in the Maritime Provinces of Canada.

Species	NB	mNS	CB	PE	References
ALEOCHARINAE					
Gymnusini					
Gymnusa atra Casey *	1		1		Klimaszewski (1979), Campbell and Davies (1991), Klimaszewski et al. (2005a), Gouix and Klimaszewski (2007)
Gymnusa campbelli Klimaszewski	1				Klimaszewski (1982b), Campbell and Davies (1991), Gouix and Klimaszewski (2007)
Gymnusa grandiceps Casey	1	1			Klimaszewski (1979), Campbell and Davies (1991), Majka and Klimaszewski (2008b), Gouix and Klimaszewski (2007), Webster et al. (2009)
Gymnusa pseudovariegata Klimaszewski	1	1	1		Klimaszewski (1979), Campbell and Davies (1991), Gouix and Klimaszewski (2007)
Deinopsini					
Deinopsis canadensis Klimaszewski	1				Webster et al. (2009)
Deinopsis harringtoni Casey	1	1	1		Klimaszewski (1979), Campbell and Davies (1991), Gouix and Klimaszewski (2007), Bishop et al. (2009)
Deinopsis rhadina Klimaszewski	1				Webster et al. (2009)

Species	NB	mNS	CB	PE	References
Aleocharini					
subtribe Aleocharina					
subgenus *Aleochara* Mulsant and Rey					
Aleochara curtula (Goeze) †	1	1		1	Klimaszewski (1984), Campbell and Davies (1991), Klimaszewski et al. (2005a), Gouix and Klimaszewski (2007), Majka and Klimaszewski (2008a), Michaud et al. (2010)
Aleochara gracilicornis Bernhauer	1	1	1		Klimaszewski (1984), Campbell and Davies (1991), Klimaszewski et al. (2005a), Gouix and Klimaszewski (2007)
Aleochara sekanai Klimaszewski	1				Majka et al. (2009), Michaud et al. (2010)
Aleochara tahoensis Casey	1		1		Klimaszewski (1984), Campbell and Davies (1991), Klimaszewski et al. (2005a), Gouix and Klimaszewski (2007)
subgenus *Calochara* Casey					
Aleochara villosa Mannerheim	1				Webster et al. (2009)
subgenus *Coprochara* Mulsant and Rey					
Aleochara bilineata Gyllenhal †	1	1	1	1	Klimaszewski (1984), Campbell and Davies (1991), Klimaszewski et al. (2005a), Gouix and Klimaszewski (2007)
Aleochara bimaculata Gravenhorst	1	1	1		Klimaszewski (1984), Gouix and Klimaszewski (2007), Michaud et al. (2010), present study
Aleochara verna Bernhauer	1	1		1	Klimaszewski (1984), Campbell and Davies (1991), Klimaszewski et al. (2005a), Gouix and Klimaszewski (2007), Michaud et al. (2010)
subgenus *Emplenota* Casey					
Aleochara litoralis (Mäklin)	1	1	1		Klimaszewski (1984), Campbell and Davies (1991), Majka and Ogden (2006), Gouix and Klimaszewski (2007), Majka et al. (2008), Majka et al. (in press)
subgenus *Euryodma*					
Aleochara caseyi Likovsky	1				Klimaszewski et al. (2005a), Gouix and Klimaszewski (2007)
subgenus *Xenochara* Mulsant and Rey					
Aleochara castaneipennis Mannerheim	1	1			Klimaszewski et al. (2005a), Gouix and Klimaszewski (2007), Dollin et al. (2008), present study
Aleochara fumata Gravenhorst †	1	1	1	1	Klimaszewski (1984), Campbell and Davies (1991), Klimaszewski et al. (2005a), Gouix and Klimaszewski (2007), Michaud et al. (2010), Majka et al. (in press)
Aleochara inexspectata Klimaszewski	1	1			Klimaszewski (1984), Campbell and Davies (1991), Gouix and Klimaszewski (2007), Webster et al. (2009)
Aleochara lacertina Sharp	1	1	1		Klimaszewski (1984), Campbell and Davies (1991), Gouix and Klimaszewski (2007)

Species	NB	mNS	CB	PE	References
Aleochara lanuginosa Gravenhorst	1	1			Majka and Klimaszewski (2008a), Webster et al. (2009)
Aleochara sculptiventris (Casey)	1				Klimaszewski (1984), Campbell and Davies (1991), Michaud et al. (2010)
Aleochara tristis Gravenhorst †	1				Klimaszewski et al. (2005a), Gouix and Klimaszewski (2007)
Tinotus morion (Gravenhorst) †	1	1			Klimaszewski et al. (2002, 2005), Gouix and Klimaszewski (2007), Bishop et al. (2009)
Hoplandriini					
Hoplandria lateralis (Melsheimer)	1				Webster et al. (2009)
Oxypodini					
subtribe Oxypodina					
Amarochara formicina Assing	1				Assing (2007), Gouix and Klimaszewski (2007), Webster et al. (2009)
Amarochara inquilina (Casey)	1				Assing (2007), Gouix and Klimaszewski (2007), Webster et al. (2009)
Calodera parviceps (Casey)	1	1	1		Assing (2008), Webster et al. (2009)
Crataraea suturalis (Mannerheim) †	1	1			Klimaszewski et al. (2007), Gouix and Klimaszewski (2007), Webster et al. (2009)
Devia prospera (Erichson)	1				Webster et al. (2009)
Gennadota canadensis Casey	1	1	1		Majka et al. (2006b), Gouix and Klimaszewski (2007), Moseley (2007, 2009), Webster et al. (2009), Michaud et al. (2010)
Hylota ochracea Casey	1	1	1		Majka et al. (2006a), Gouix and Klimaszewski (2007), Webster et al. (2009)
Ilyobates bennetti Donisthorpe †	1	1			Majka and Klimaszewski (2008b), Webster et al. (2009)
Ocyusa asperula Casey	1				Webster et al. (2009)
Oxypoda amica Casey	1	1			Klimaszewski et al. (2005a), Gouix and Klimaszewski (2007), Dollin et al. (2008)
Oxypoda brachyptera (Stephens) †	1	1			Klimaszewski et al. (2006b), Gouix and Klimaszewski (2007), Majka and Klimaszewski (2008a)
Oxypoda chantali Klimaszewski		1			present study
Oxypoda convergens Casey	1	1	1		Klimaszewski et al. (2005a), Gouix and Klimaszewski (2007)
Oxypoda demissa Casey	1		1		Klimaszewski et al. (2006b), Gouix and Klimaszewski (2007), Webster et al. (2009)
Oxypoda frigida Bernhauer	1		1		Klimaszewski et al. (2006b), Gouix and Klimaszewski (2007)
Oxypoda gnara Casey	1				Webster et al. (2009)
Oxypoda grandipennis (Casey)	1		1		Klimaszewski et al. (2005, 2006b), Gouix and Klimaszewski (2007)
Oxypoda hiemalis Casey	1		1		Klimaszewski et al. (2006b), Gouix and Klimaszewski (2007)
Oxypoda inimica Casey	1				Klimaszewski et al. (2006b), Gouix and Klimaszewski (2007)

Species	NB	mNS	CB	PE	References
Oxypoda lacustris Casey	1	1			Klimaszewski et al. (2005a), Webster et al. (2009)
Oxypoda lucidula Casey	1				Webster et al. (2009)
Oxypoda nigriceps Casey	1	1	1		Klimaszewski et al. (2005, 2006b), Gouix and Klimaszewski (2007), Bishop et al. (2009)
Oxypoda opaca (Gravenhorst) †	1	1			Klimaszewski et al. (2006b), Gouix and Klimaszewski (2007), Webster et al. (2009)
Oxypoda operta Sjöberg †			1		Klimaszewski et al. (2006b), Gouix and Klimaszewski (2007)
Oxypoda orbicollis Casey			1		Klimaszewski et al. (2006b), Gouix and Klimaszewski (2007)
Oxypoda perexilis Casey		1			present study
Oxypoda pseudolacustris Klimaszewski	1	1	1		Klimaszewski et al. (2006b), Gouix and Klimaszewski (2007)
Oxypoda vockerothi Klimaszewski	1				Webster et al. (2009)
Phloeopora sp. [1]		1			Bishop et al. (2009)
subtribe Meoticina					
Alisalia elongata Klimaszewski and Webster	1				Klimaszewski et al. (2009a)
Alisalia minuta Klimaszewski and Webster	1				Klimaszewski et al. (2009a)
Alisalia testacea Casey	1				Klimaszewski et al. (2009a)
Meotica exilis (Erichson) †		1			Majka and Klimaszewski (2008b)
Meotica pallens (Redtenbacher) †		1			Majka and Klimaszewski (2008b)
subtribe Tachyusina					
Gnypeta caerulea (C.R. Sahlberg) †	1		1	1	Klimaszewski et al. (2008a), Majka and Klimaszewski (2008a, 2008b)
Gnypeta carbonaria Mannerheim *	1				Klimaszewski et al. (2008a)
Gnypeta nigrella (LeConte)	1				Klimaszewski et al. (2008a)
Gnypeta saccharina Klimaszewski and Webster	1				Klimaszewski et al. (2008a)
Gnypeta minuta Klimaszewski and Webster	1				Klimaszewski et al. (2008a)
Meronera venustula (Erichson)	1				Majka and Klimaszewski (2008b)
Tachyusa americana Casey	1				Webster et al. (2009)
Tachyusa americanoides Pasnik		1			Pasnik (2006), Gouix and Klimaszewski (2007)
Hypocyphtini					
Oligota chrysopyga Kraatz ? † [1]	1				unpublished
Oligota parva Kraatz				1	Majka et al. (2008)

Species	NB	mNS	CB	PE	References
Oligota nr. ruficornis Sharp † [1]		1			unpublished
Myllaenini					
Myllaena arcana Casey	1	1			Klimaszewski (1982a), Campbell and Davies (1991), Klimaszewski et al. (2005a), Gouix and Klimaszewski (2007), Bishop et al. (2009), present study
Myllaena audax Casey	1				Klimaszewski (1982a), Campbell and Davies (1991), Gouix and Klimaszewski (2007)
Myllaena cuneata Notman		1			present study
Myllaena insomnis Casey	1		1		Klimaszewski (1982a), Campbell and Davies (1991), Gouix and Klimaszewski (2007)
Myllaena kaskaskia Klimaszewski	1				Webster et al. (2009)
Myllaena ludificans Casey	1				Webster et al. (2009)
Myllaena procidua Casey	1				Webster et al. (2009)
Myllaena vulpina Bernhauer	1		1		Klimaszewski (1982a), Campbell and Davies (1991), Gouix and Klimaszewski (2007), Webster et al. (2009)
Dioglottini					
Dioglota mersa (Haliday) †	1				Klimaszewski et al. (2008b)
Autaliini					
Autalia rivularis (Gravenhorst) †	1	1			Klimaszewski et al. (2005a),Gouix and Klimaszewski (2007), Majka and Klimaszewski (2008a)
Homalotini					
subtribe Bolitocharina					
Neotobia alberta Ashe	1				Webster et al. (2009)
Phymatura blanchardi (Casey)	1				Webster et al. (2009)
Silusida marginella (Casey)	1	1	1		Klimaszewski et al. (2005a), Gouix and Klimaszewski (2007), Dollin et al. (2008), Majka and Klimaszewski (2008b)
subtribe Gyrophaenina					
Eumicrota corruscula Erichson	1				Klimaszewski et al. (2009c)
Eumicrota socia (Erichson)	1	1		1	Klimaszewski et al. (2009c), Dollin et al. (2008), present study
subgenus *Gyrophaena* Mannerheim					
Gyrophaena affinis Mannerheim †	1	1	1		Campbell and Davies (1991), Gouix and Klimaszewski (2007), Klimaszewski et al. (2009c), Majka and Klimaszewski (2008a), Dollin et al. (2008), Majka et al. (in press)
Gyrophaena antennalis Casey	1	1			Campbell and Davies (1991), Gouix and Klimaszewski (2007), Klimaszewski et al. (2009c)
Gyrophaena caseyi Seevers	1				Klimaszewski et al. (2009c)
Gyrophaena chippewa Seevers	1				Klimaszewski et al. (2009c)
Gyrophaena criddlei Casey	1				Klimaszewski et al. (2009c)

Species	NB	mNS	CB	PE	References
Gyrophaena dybasi Seevers	1				Klimaszewski et al. (2009c)
Gyrophaena flavicornis Melsheimer	1	1	1		Klimaszewski et al. (2009c), Dollin et al. (2008)
Gyrophaena fuscicollis Casey	1				Klimaszewski et al. (2009c)
Gyrophaena gaudens Casey	1	1		1	Klimaszewski et al. (2009c), present study
Gyrophaena gilvicollis Casey	1				Klimaszewski et al. (2009c)
Gyrophaena illiana Seevers	1				Klimaszewski et al. (2009c)
Gyrophaena insolens Casey	1				Campbell and Davies (1991), Gouix and Klimaszewski (2007), Klimaszewski et al. (2009c)
Gyrophaena involuta Casey	1				Klimaszewski et al. (2009c)
Gyrophaena keeni Casey	1				Campbell and Davies (1991), Klimaszewski et al. (2005, 2009c)
Gyrophaena laetula Casey	1				Klimaszewski et al. (2009c)
Gyrophaena lobata Casey	1				Klimaszewski et al. (2009c)
Gyrophaena modesta Casey	1	1			Campbell and Davies (1991), Gouix and Klimaszewski (2007), Klimaszewski et al. (2009c)
Gyrophaena pseudocriddlei Klimaszewski and Webster	1				Klimaszewski et al. (2009c)
Gyrophaena sculptipennis Casey	1	1			Klimaszewski et al. (2009c), Dollin et al. (2008)
Gyrophaena uteana Casey	1				Klimaszewski et al. (2009c)
Gyrophaena vitrina Casey	1				Klimaszewski et al. (2009c)
subgenus *Phaenogyra* Mulsant and Rey					
Gyrophaena gracilis Seevers	1				Klimaszewski et al. (2009c)
Gyrophaena meduxnekeagensis Klimaszewski and Webster	1				Klimaszewski et al. (2009c)
Gyrophaena subnitens Casey	1	1			Klimaszewski et al. (2009c)
subtribe Homalotina					
Homalota plana (Gyllenhal) †	1	1			Majka and Klimaszewski (2004), Klimaszewski et al. (2007), Gouix and Klimaszewski (2007)
subtribe Leptusina					
Euvira micmac Klimaszewski and Majka	1	1			Klimaszewski and Majka (2007b), Gouix and Klimaszewski (2007), Webster et al. (2009)
Leptusa incertae sedis					
Leptusa gatineauensis Klimaszewski and Pelletier		1			Klimaszewski et al. (2004), Gouix and Klimaszewski (2007), Bishop et al. (2009)
subgenus *Adoxopisalia* Pace					
Leptusa opaca Casey	1	1	1	1	Klimaszewski et al. (2004, 2005), Gouix and Klimaszewski (2007), Dollin et al. (2008), Bishop et al. (2009)

Species	NB	mNS	CB	PE	References
Leptusa pseudopaca Klimaszewski and Majka		1	1		Klimaszewski et al. (2004), Gouix and Klimaszewski (2007), Dollin et al. (2008)
subgenus *Boreoleptusa* Pace					
Leptusa canonica Casey		1	1		Klimaszewski et al. (2004), Gouix and Klimaszewski (2007), Dollin et al. (2008), Bishop et al. (2009)
Leptusa jucunda Klimaszewski and Majka	1	1			Klimaszewski et al. (2004), Majka and Klimaszewski (2004), Gouix and Klimaszewski (2007)
subgenus *Dysleptusa* Pace					
Leptusa carolinensis Pace	1	1			Klimaszewski et al. (2004), Gouix and Klimaszewski (2007), Bishop et al. (2009), Webster et al. (2009)
subgenus *Eucryptusa* Casey					
Leptusa brevicollis Casey	1	1	1	1	Klimaszewski et al. (2004, 2005), Gouix and Klimaszewski (2007), Dollin et al. (2008), Bishop et al. (2009)
subtribe Silusina					
Silusa alternans Sachse	1		1	1	Klimaszewski et al. (2003, 2005), Gouix and Klimaszewski (2007), present study
Silusa californica Bernhauer	1	1	1		Klimaszewski et al. (2003, 2005), Gouix and Klimaszewski (2007)
Silusa densa Fenyes	1				Webster et al. (2009)
Placusini					
Placusa canadensis Klimaszewski		1			present study
Placusa incompleta Sjöberg †	1		1		Klimaszewski et al. (2001), Gouix and Klimaszewski (2007), Webster et al. (2009)
Placusa tachyporoides (Waltl) †	1	1	1		Klimaszewski et al. (2001), Gouix and Klimaszewski (2007), Majka and Klimaszewski (2008a)
Placusa tacomae Casey	1	1			Klimaszewski et al. (2001), Majka and Klimaszewski (2004), Gouix and Klimaszewski (2007), Dollin et al. (2008), Webster et al. (2009)
Placusa vaga Casey	1	1			Webster et al. (2009)
Athetini					
subtribe Acrotonina					
Acrotona avia (Casey)		1			Majka et al. (2008)
Acrotona nr. smithi Casey [1]	1				unpublished
Acrotona subpygmaea Bernahuer	1	1			Klimaszewski et al. (2005a), Gouix and Klimaszewski (2007), present study
Mocyta breviuscula (Mäklin)	1	1			Majka and Klimaszewski (2008b), Bishop et al. (2009), Webster et al. (2009)
Mocyta fungi (Gravenhorst) †	1	1	1	1	Gusarov (2003), Klimaszewski et al. (2005a), Gouix and Klimaszewski (2007), Majka and Klimaszewski (2008a), Majka et al. (2008), Michaud et al. (2010)
Strigota ambigua (Erichson)		1		1	Majka et al. (2008)

Species	NB	mNS	CB	PE	References
subtribe Athetina					
Aloconota sulcifrons (Stephens) †	1				Webster et al. (2009)
Amischa analis (Gravenhorst) †	1	1	1	1	Klimaszewski et al. (2005a), Gouix and Klimaszewski (2007), Majka and Klimaszewski (2008a), Bishop et al. (2009)
Atheta incertae sedis					
Atheta annexa Casey	1	1			Majka and Klimaszewski (2008b), Webster et al. (2009), Moseley (2009)
Atheta brunswickensis Klimaszewski	1	1			Klimaszewski et al. (2005a), Gouix and Klimaszewski (2007), Majka and Klimaszewski (2008b), Bishop et al. (2009)
Atheta capsularis Klimaszewski	1				Klimaszewski et al. (2005a), Gouix and Klimaszewski (2007)
Atheta districta Casey	1	1			Klimaszewski et al. (2005a), Gouix and Klimaszewski (2007), Majka and Klimaszewski (2008b), Michaud et al. (2010)
Atheta irrita Casey	1	1	1		Majka et al. (2006a), Gouix and Klimaszewski (2007), Webster et al. (2009)
Atheta novaescotiae Klimaszewski and Majka	1	1	1		Klimaszewski et al. (2006a), Majka and Ogden (2006), Gouix and Klimaszewski (2007), Majka and Klimaszewski (2008b), Majka et al. (2008), Webster et al. (2009)
Atheta remulsa Casey	1	1	1		Klimaszewski et al. (2005a), Gouix and Klimaszewski (2007), Dollin et al. (2008), Majka and Klimaszewski (2008b), Majka et al. (in press)
Atheta strigosula Casey	1				Klimaszewski et al. (2005a), Gouix and Klimaszewski (2007)
subgenus *Alaobia* Thompson					
Atheta ventricosa Bernhauer	1	1			Gusarov (2003), Klimaszewski et al. (2005a), Gouix and Klimaszewski (2007), Majka and Klimaszewski (2008b), Bishop et al. (2009)
subgenus *Atheta* (*s. str.*) Thompson					
Atheta aemula (Erichson)	1				Webster et al. (2009)
Atheta graminicola (Gravenhorst)	1				Webster et al. (2009)
subgenus *Chaetida* Mulsant and Rey					
Atheta longicornis (Gravenhorst) †	1	1			Klimaszewski et al. (2007), Gouix and Klimaszewski (2007), Webster et al. (2009), Michaud et al. (2010)
subgenus *Datomicra* Mulsant and Rey					
Atheta acadiensis Klimaszewski and Majka	1	1	1	1	Klimaszewski and Majka (2007a), Gouix and Klimaszewski (2007), Majka et al. (2008), Majka et al. (in press)
Atheta celata (Erichson) †	1	1	1		Majka et al. (2006a), Gouix and Klimaszewski (2007), Majka and Klimaszewski (2008a)
Atheta dadopora Thomson †	1	1		1	Klimaszewski et al. (2005a), Gouix and Klimaszewski (2007), Majka and Klimaszewski (2008a, 2008b), Dollin et al. (2008), Bishop et al. (2009)

Species	NB	mNS	CB	PE	References
subgenus *Dimetrota* Mulsant and Rey					
Atheta burwelli (Lohse)	1				Majka and Klimaszewski (2008b)
Atheta crenuliventris Bernhauer	1				Klimaszewski et al. (2005a), Gouix and Klimaszewski (2007)
Atheta hampshirensis Bernhauer	1	1			Klimaszewski and Winchester (2002), Klimaszewski et al. (2005a), Dollin et al. (2008), Majka and Klimaszewski (2008b), Bishop et al. (2009), Webster et al. (2009)
Atheta modesta (Melsheimer)	1	1	1		Gusarov (2003), Klimaszewski et al. (2005a), Gouix and Klimaszewski (2007), Dollin et al. (2008), Majka and Klimaszewski (2008b)
Atheta prudhoensis (Lohse)	1		1		Majka and Klimaszewski (2008b), Webster et al. (2009)
Atheta pseudocrenuliventris Klimaszewski	1		1		Klimaszewski et al. (2005a), Majka et al. (2006a), Gouix and Klimaszewski (2007), Michaud et al. (2010)
Atheta pseudomodesta Klimaszewski		1			Majka and Klimaszewski (2008b)
Atheta nr. smetanai and campbelli (Lohse) [1]	1				Michaud et al. (2010)
subgenus *Metadimetrota* Klimaszewski and Winchester					
Atheta savardae Klimaszewski and Majka	1	1	1		Klimaszewski and Majka (2007a), Gouix and Klimaszewski (2007), Webster et al. (2009), Michaud et al. (2010)
subgenus *Microdota* Mulsant and Rey					
Atheta amicula (Stephens) †		1			Klimaszewski et al. (2008a)
Atheta particula (Casey)	1	1			Klimaszewski et al. (2005a), Gouix and Klimaszewski (2007), present study
Atheta pennsylvanica Bernhauer	1	1	1		Klimaszewski et al. (2005a), Dollin et al. (2008), Majka and Klimaszewski (2008b), Bishop et al. (2009), Majka et al. (in press)
Atheta platanoffi Brundin *	1	1			Klimaszewski et al. (2005a), Majka and Klimaszewski (2008b)
subgenus *Pseudota* Casey					
Atheta klagesi Bernhauer *	1	1		1	Dollin et al. (2008), Majka and Klimaszewski (2008b), Bishop et al. (2009), Webster et al. (2009)
subgenus *Tetropla* Mulsant and Rey					
Atheta frosti Bernhauer	1	1	1		Klimaszewski et al. (2005a), Gouix and Klimaszewski (2007), Majka and Klimaszewski (2008b)
subgenus *Thinobaena* Thomson					
Atheta vestita (Gravenhorst) †	1	1	1		Klimaszewski et al. (2007), Gouix and Klimaszewski (2007), Majka et al. (2008)
Dalotia coriaria (Kraatz) †	1	1			Webster et al. (2009)
Dinarea angustula (Gyllenhal) †	1	1	1	1	Klimaszewski et al. (2007), Gouix and Klimaszewski (2007), Webster et al. (2009)

Species	NB	mNS	CB	PE	References
Dochmonota rudiventris (Eppelsheim) †	1				Webster et al. (2009)
Halobrecta flavipes Thomson †	1				Klimaszewski et al. (2008b)
Liogluta aloconotoides Lohse		1			Majka and Klimaszewski (2008b)
Nehemitropia lividipennis (Mannerheim) †	1	1		1	Klimaszewski et al. (2007), Gouix and Klimaszewski (2007), Michaud et al. (2010)
Philhygra angusticauda (Bernhauer)	1				Webster et al. (2009)
Philhygra botanicarum Muona *	1		1		Klimaszewski et al. (2008a), Webster et al. (2009)
Philhygra clemens (Casey)	1	1			Klimaszewski et al. (2005a), Majka and Klimaszewski (2008b)
Philhygra "insulivaga" [Gusarov] [2]	1				Klimaszewski et al. (2005a)
Philhygra lavicollis (Mäklin)	1	1			Klimaszewski et al. (2005a), Gouix and Klimaszewski (2007), Majka and Klimaszewski (2008b)
Philhygra "lustrivaga" [Gusarov] [2]	1				Gusarov (2001-2003), Gouix and Klimaszewski (2007), Klimaszewski et al. (2005a)
Philhygra "riprivaga" [Gusarov] [2]	1				Gusarov (2001-2003), Gouix and Klimaszewski (2007), Klimaszewski et al. (2005a)
subgenus *Schistoglossa* Kraatz					
Schistoglossa pseudoCampbelli Klimaszewski and Webster	1				Klimaszewski et al. (2009b)
Schistoglossa brunswickensis Klimaszewski and Webster	1				Klimaszewski et al. (2009b)
Schistoglossa hampshirensis Klimaszewski	1				Klimaszewski et al. (2009b)
subgenus *Boreomorpha* Klimaszewski and Webster					
Schistoglossa sphagnorum Klimaszewski and Webster	1				Klimaszewski et al. (2009b)
Schistoglossa blatchleyi (Bernhauer and Scheerpeltz)	1				Gusarov (2003), Gouix and Klimaszewski (2007), Klimaszewski et al. (2009b)
subtribe Geostibina					
Earota dentata (Bernhauer)	1	1	1		Klimaszewski et al. (2005a), Majka and Klimaszewski (2008b), Webster et al. (2009)
subgenus *Geostiba* (*s. str.*) Thomson					
Geostiba circellaris (Gravenhorst) †	1				Webster et al. (2009)
subgenus *Sibiota* Casey					
Geostiba appalachigena Gusarov	1	1			Klimaszewski et al. (2005a), Gouix and Klimaszewski (2007), present study

Species	NB	mNS	CB	PE	References
Lypoglossa angularis obtusa (LeConte)			1		present study
Lypoglossa franclemonti Hoebeke	1		1		Hoebeke (1992), Gusarov (2004), Gouix and Klimaszewski (2007), Webster et al. (2009)
Seeversiella globicollis (Bernhauer)			1		Majka and Klimaszewski (2008b)
Strophogastra penicillata Fenyes	1	1			Klimaszewski et al. (2005a), Gouix and Klimaszewski (2007), Majka and Klimaszewski (2008b)
Trichiusa postica Casey		1			present study
Falagriini					
Cordalia obscura (Gravenhorst) †		1			Klimaszewski et al. (2008a)
Falagria dissecta Erichson	1				Howden (1970), Hoebeke (1985), Wright (1989), Campbell and Davies (1991), Gouix and Klimaszewski (2007), Majka et al. (2008)
Myrmecocephalus cingulatus (LeConte)		1			Hoebeke (1985), Campbell and Davies (1991), Gouix and Klimaszewski (2007)
Myrmecocephalus gatineauensis Hoebeke	1				Hoebeke (1985), Campbell and Davies (1991), Gouix and Klimaszewski (2007)
Myrmecopora vaga (LeConte)		1			Majka et al. (2008)
Lomechusini					
subtribe Lomechusina					
Xenodusa reflexa (Walker)	1	1			Majka and Klimaszewski (2008b), Webster et al. (2009)
subtribe Myrmedoniina					
Drusilla canaliculata (Fabricius) †	1	1	1	1	Klimaszewski et al. (2008a), Webster et al. (2009)
Pella gesneri Klimaszewski	1				Klimaszewski et al. (2005a, 2005b)
Pella loricata (Casey)		1			Klimaszewski et al. (2009)
Pella glooscapi Klimaszewski and Majka		1			Klimaszewski et al. (2009)
subgenus *Zyras* (*s. str.*) Stephens					
Zyras obliquus Casey	1	1			Webster et al. (2009), present study
	175	**106**	**57**	**20**	

Notes: NB, New Brunswick; mNS, mainland Nova Scotia; CB, Cape Breton Island; PE, Prince Edward Island; References, arranged in chronological order, consist of those reporting the species from the Maritime Provinces. † adventive Palaearctic species; * Holarctic species; no symbol, native Nearctic species; 1 Identity of species still undetermined or uncertain; 2 Unpublished manuscript name.

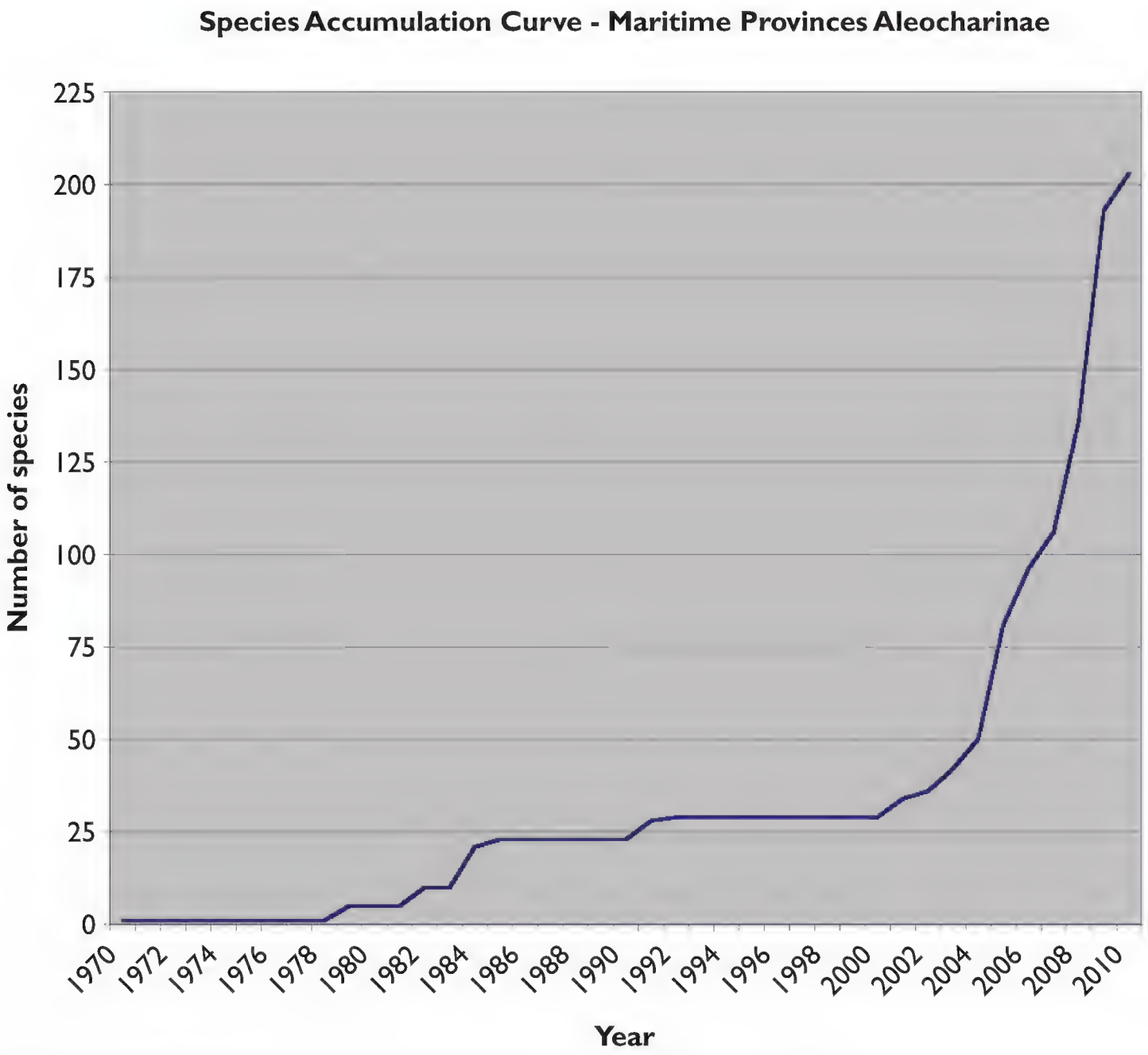

Figure 1. Species accumulation curve of the Maritime Provinces Aleocharinae

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